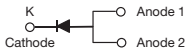
SS12P4S

Vishay General Semiconductor

SMD Photovoltaic Solar Cell Protection Schottky Rectifier

eSMP® Series

TO-277A (SMPC)



FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Guardring for overvoltage protection
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

RoHS COMPLIANT
HALOGEN FREE

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	12 A
V_{RRM}	40 V
I_{FSM}	280 A
E_{AS}	20 mJ
V_F at I_F = 12 A	0.43 V
T_J max.	150 °C

MECHANICAL DATA

Case: TO-277A (SMPC)
Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS compliant, and commercial grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 1A whisker test

TYPICAL APPLICATIONS

For use in solar cell junction box as a bypass diode for protection, using DC forward current without reverse bias.

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	SS12P4S	UNIT
Device marking code		124S	
Maximum repetitive peak reverse voltage	V_{RRM}	40	V
Maximum DC forward current (fig. 1)	I_F	12 (1) 4.4 (2)	A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	280	A
Non-repetitive avalanche energy at I_{AS} = 2.0 A, T_J = 25 °C	E_{AS}	20	mJ
Operating junction and storage temperature range	T_{OP}, T_{STG}	- 55 to + 150	°C
Junction temperature in DC forward current without reverse bias, t ≤ 1 h (3)	T_J	≤ 200	°C

Notes

(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink
(2) Free air, mounted on recommended copper pad area
(3) Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test

For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I_F = 6 A	T_A = 25 °C	V_F (1)	0.43	-	V
	I_F = 12 A			0.50	0.60	
	I_F = 6 A	T_A = 125 °C		0.33	-	
	I_F = 12 A			0.43	0.52	
Reverse current	V_R = 40 V	T_A = 25 °C	I_R (2)	100	800	µA
		T_A = 125 °C		50	100	mA
Typical junction capacitance	4.0 V, 1 MHz		C_J	750	-	pF

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)	100	°C/W
	$R_{\theta JM}$ (2)	3	

Notes

(1) Free air, mounted on recommended copper pad area. Thermal resistance $R_{\theta JA}$ - junction to ambient.

(2) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink. Thermal resistance $R_{\theta JM}$ - junction to mount.

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SS12P4S-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
SS12P4S-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel

RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

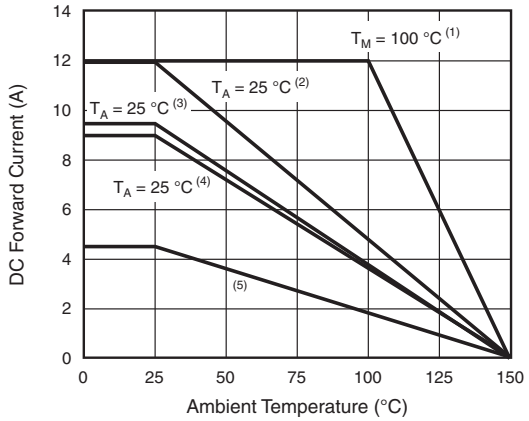

Fig. 1 - Maximum Current Derating Curve

Notes

(1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink, T_M measured at the terminal of cathode band

(2) Mounted on 30 mm x 30 mm Al PCB ($R_{\theta JA}$ = 20 °C/W)

(3) Mounted on 30 mm x 30 mm x 2 copper pad areas FR4 PCB ($R_{\theta JA}$ = 30 °C/W)

(4) Mounted on 25 mm x 25 mm x 2 copper pad areas FR4 PCB ($R_{\theta JA}$ = 30 °C/W)

(5) Free air, mounted on recommended copper pad area ($R_{\theta JA}$ = 100 °C/W)

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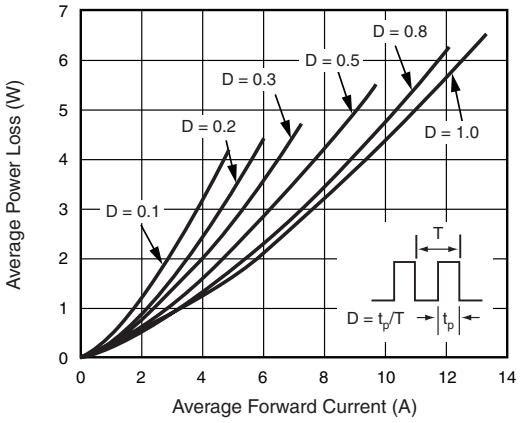

Fig. 2 - Forward Power Loss Characteristics

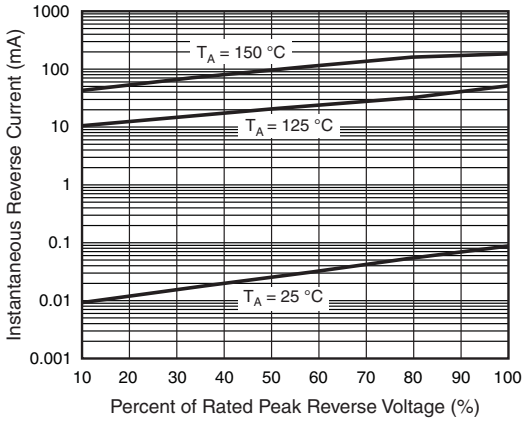

Fig. 4 - Typical Reverse Leakage Characteristics

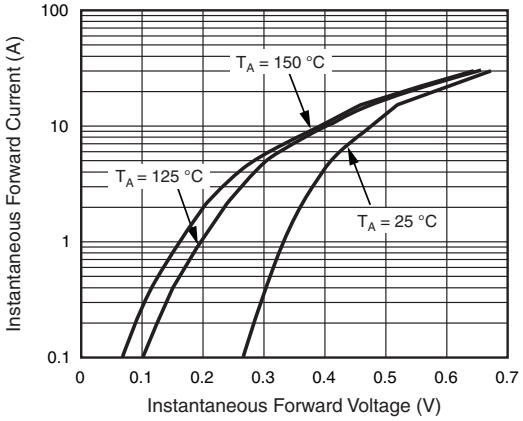

Fig. 3 - Typical Instantaneous Forward Characteristics

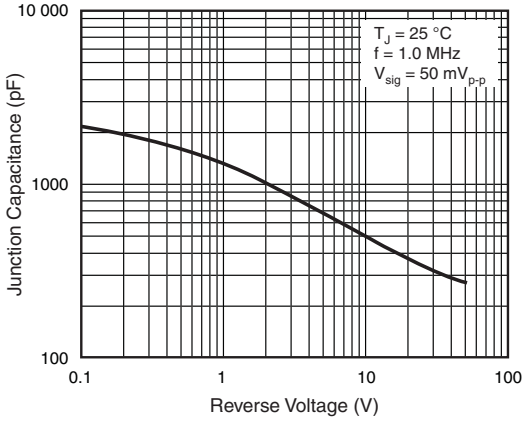

Fig. 5 - Typical Junction Capacitance

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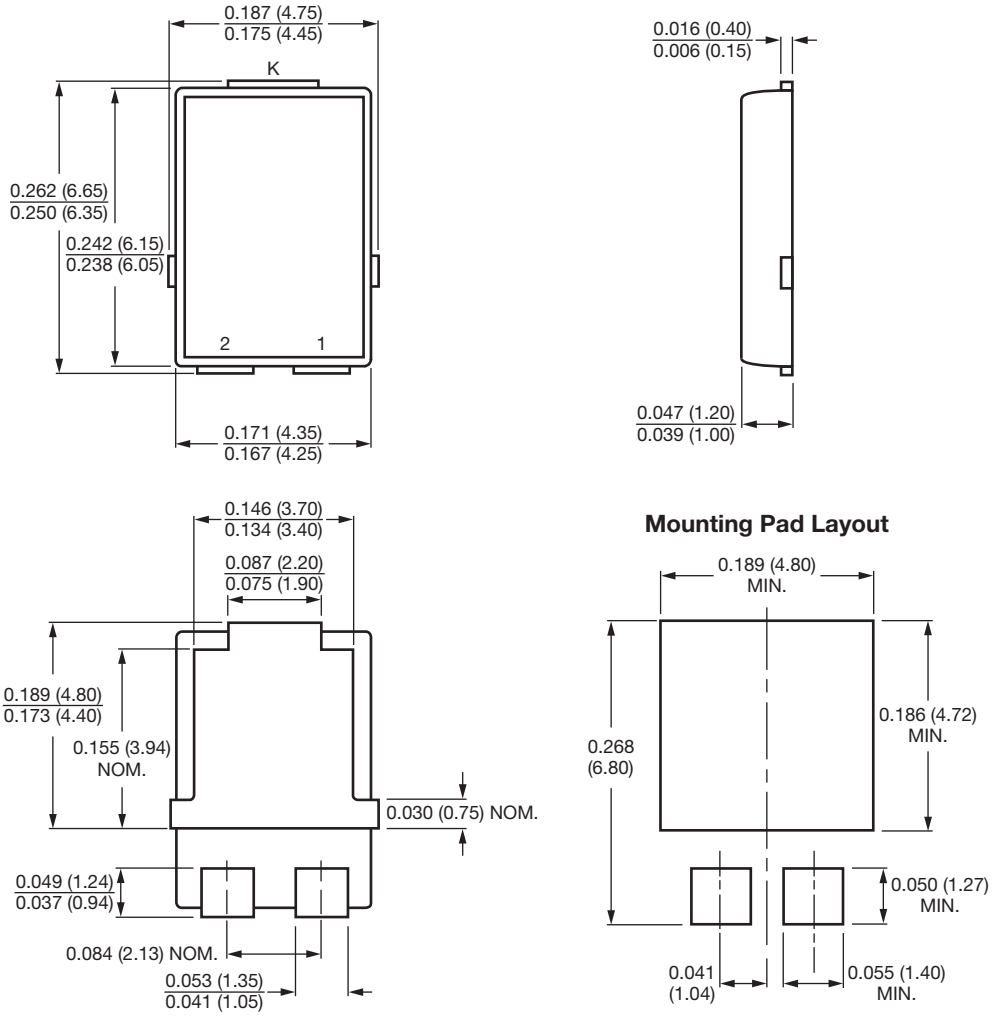
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-277A (SMPC)



Conform to JEDEC TO-277A

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